MINISTRY OF TRANSPORTATION

RoadTalk

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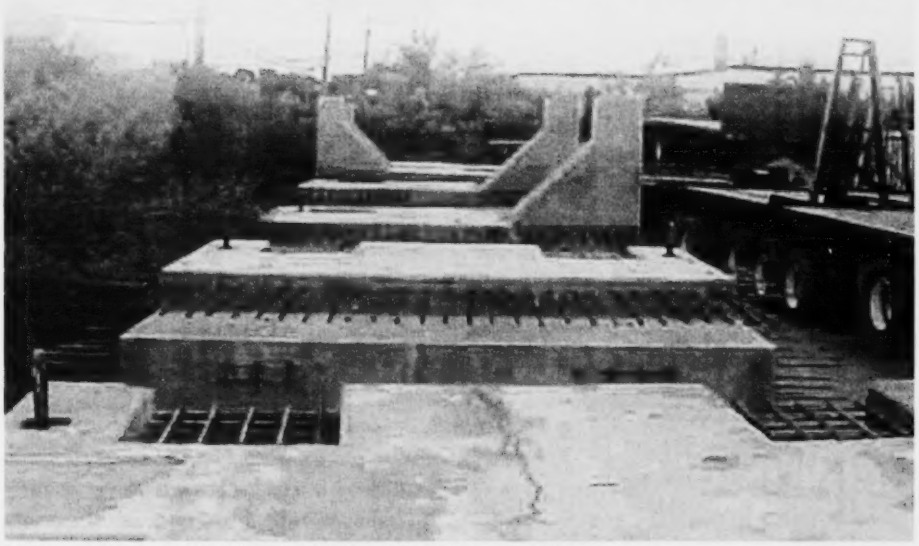
Prefabricated Bridge at Moose Creek

If Traffic Can't Wait, Prefabricate!



Sections of Moose Creek Bridge after fabrication but before assembly

Most drivers have experienced delays and hazards when approaching the construction site of a new bridge. MTO recognizes the traffic dilemmas associated with bridge construction and is implementing initiatives that address these concerns while improving the durability and lowering the life cycle cost of new bridges. One of MTO's initiatives makes use of prefabricated design for new bridges built in high traffic areas. Such design allows bridge elements to be fabricated at a manufacturing plant, and then shipped to the construction site for rapid assembly. One of MTO's prefabricated bridge projects was recently completed, and is situated 680 km north of Toronto on Hwy 101. This prefabricated project is known as the Moose Creek Bridge.

Prefabrication, as a design technique, has been used by MTO in the past, but the Moose Creek project is a step above anything done before. Moose Creek is the first bridge in Ontario where prefabrication was used in constructing a bridge substructure (abutments and wingwalls) as well as its superstructure (girders and deck). In past projects, prefabrication was only used for constructing superstructure elements and culverts.

During this fabrication, most of the concrete used was cast off site. The only concrete cast-in-place (cast on the construction site) was used for minor details such as the approach slabs, barrier walls, and the in-fill strips that were used to integrate prefabricated components. Future plans may call for even more precast components, less onsite work, and involve multi-span structures.

These future advancements would be made possible through MTO's co-operation with consultants, fabricators and contractors. This close co-ordination is needed because applying prefabrication to bridge construction is not common in Ontario. Given this market condition, the success of future initiatives depends on tightly coordinated planning, design, and construction. In the case of the Moose Creek project, MTO's partners were Stantec Consulting Ltd., Miller Paving Ltd., and Pre-Con Inc.

The bridge components were fabricated in two of Pre-Con's plants, one in Brampton and the other in Bellville. After fabrication, the bridge components were transported from the plants, by road, to Moose Creek. All components were transported and assembled in two instal- >

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www.mto.gov.on.ca/english/transtek/roadtalk.
This publication reports on innovations and new technology relating to highway management; the design, construction, operation and maintenance of highway infrastructure.

Readers are encouraged to submit articles, news items and comments to Kristin MacIntosh, Editor, at:
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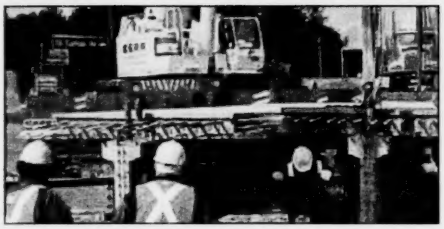

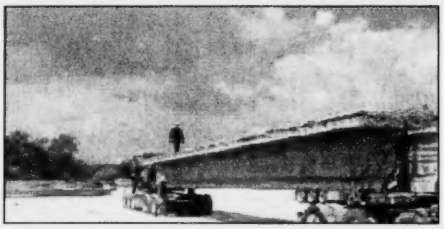

TOP: Close view of two prefabricated bridge sections set in place for eventual integration
MIDDLE: Wide view of top picture
BOTTOM: Transportation of a bridge section that consists of one T-girder integrated with a section of the concrete slab

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The reduced on-site construction time resulted in benefits for all stakeholders. Road users did not face delays, workers did not have to deal with the safety hazards of a conventional construction site, and the risk of environmental damage was avoided due to reduced construction activity. Clearly, using prefabrication proved to be beneficial for all parties concerned.

Moose Creek Bridge is also expected to be more durable due to the prefabrication process. Since its components were fabricated in a controlled environment, this bridge will require less future maintenance and rehabilitation when compared to bridges built using normal construction practices. This means that the initial cost of Moose Creek, which was higher than average, will likely be offset by a less-than-average need for future maintenance.

This benefit of increased durability is just as impressive as those benefits offered to users, workers, and the environment. Considering these, it becomes clear why this prefabrication process is being pursued by MTO.

Future plans are directed at taking full advantage of this process. The Ministry hopes that increased use of this technology and its standardisation will encourage even larger prefabrication projects which will ensure the future durability and cost effectiveness of Ontario's bridges.

The successful completion of the Moose Creek Bridge without any significant design, fabrication, transportation, or erection problems is encouraging and it is expected that techniques developed for this bridge will be used in future projects.●

For more information, contact Iqbal Husain, Bridge Office, at (905) 704-2376 or at Iqbal.Husain@mto.gov.on.ca.

Conference Reports for MTO Subscribers

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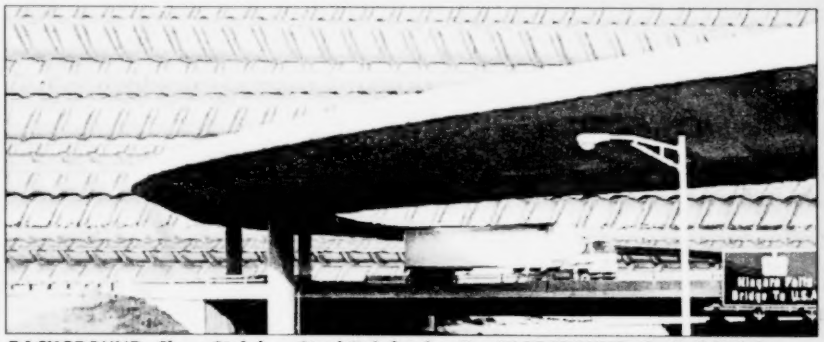
Cheaper and Greener Stainless Steel Processing

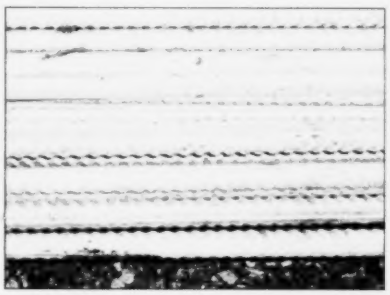


BACKGROUND: Clean Stainless Steel Reinforcing Bar FOREGROUND: Typical Stainless Steel reinforced Bridge

MTO's Highway Infrastructure Innovation Funding Program (HIIFP) recently financed a significant project with the goal of finding less expensive and more environmentally sound alternatives to the current preparation process of stainless steel reinforcing bars. There are high financial and environmental costs associated with the chemical processing that prepares stainless steel bars for use in construction. For this reason, it is in the interest of MTO and other transportation agencies to find a better preparation alternative. In search of this alternative, University of Waterloo engineering professor C. Hansson used MTO's HIIFP funding to carry out preliminary research on stainless steel processing. The results of this research have brought new insights that are valuable to MTO as it builds new structures using stainless steel reinforcement.

The results of Professor Hansson's research may allow MTO to use stainless steel reinforcement without needing to remove the mill scale. Mill scale is an oxide residue that appears after the stainless steel bars are rolled and have cooled. MTO has the mill scale removed before bars are used because it is recommended by the stainless steel industry. The removal process begins by blasting a bar's surface with stainless steel abrasive, and is then completed with a chemical process called 'pickling' that removes remnant residue. This pickling process is carried out in a tank that contains a mixture of nitric and hydrofluoric acids. Clearly, handling and disposing of pickling acid poses a serious environmental problem.

Stainless steel is used because of the extremely slow rate at which it corrodes in a chloride-contaminated concrete environment. Policy introduced by the ministry in the fall of 2000 specified the use of stainless steel reinforcement for structural components with the greatest potential for corrosion and related damage. Transportation authorities are increasingly specifying stainless steel reinforcement for critical elements of structures or for entire structures exposed to severe conditions. Use of stainless steel extends the service life of a structure while minimizing requirements for regular maintenance. This option is preferred for bridges where accessibility for future repairs may be difficult. Ultimately, it reduces maintenance-related delays to highway users, and this is a vital benefit for MTO.



Mill scale is the reddish-brown residue found on stainless steel reinforcing bar after processing.

While it is more expensive to purchase than black or epoxy-coated steel, stainless steel reinforcement can be more cost-effective over the long term because there is less of the corrosion-induced concrete damage typically seen with other types of steel and this results in lower life cycle costs.

During Professor Hansson's research, the corrosion behaviour of stainless steel reinforcement was evaluated in two environments: 1) a synthetic concrete pore solution with increasing additions of sodium chloride, and 2) ordinary Portland cement concrete prisms with admixed chlorides. The chlorides were added to simulate the behaviour of concrete structures exposed to de-icing salts. Tests were performed exclusively on 316LN and 2205 grades of stainless steel, as these are the only ones that MTO specifies for construction use. Initial results indicate that when comparing the average corrosion rates of bars with mill scale to those without, both rates fall within the same scatter of values when undergoing the same surface treatment. There does not appear to be any significant advantage to treatment that attempts to remove mill scale.

These initial results are promising because they indicate that when testing 316LN and 2205 duplex stainless steel, surface condition does not appear to play a major role in determining corrosion resistance.

This finding may encourage MTO to consider eliminating the blasting and pickling steps of processing. Down the road, this study's initial results may produce environmental advantages and could lower MTO's stainless steel reinforcement costs. This project also shows how innovative university research can produce results that have the potential to improve construction techniques. The ministry is optimistic that the results of this research will play a role in the optimization of MTO's specifications for the surface treatment of stainless steel. The results are currently undergoing peer review and must be confirmed by further research and testing.

For more information, contact Frank Pianca, Concrete Section, at (416) 235-4691 or at Frank.Pianca@mto.gov.on.ca

Asset Management Update

A New Integrated Inventory System is Coming

For over a decade, MTO has been using an application known as the Integrated Highway Information System (IHIS) to access inventory and performance information. Implementation of an asset management approach to investment decision-making requires a new integrated inventory application. The new inventory will create a robust investment-planning tool for MTO that is able to draw in data used by all areas of the ministry providing functionality that far surpasses present day IHIS.

A major task for the Asset Management Team, the project requires the integration of enormous amounts of data drawn from a broad sample of management systems. Included in the list of data subject areas pegged for integration are:

- Inventories (e.g. - pavement and bridge)
- Asset Conditions
- Traffic
- Performance Measures (e.g. - percent of pavements in good condition)
- Safety (e.g. - collisions)

Asset Management is creating the data model that forms the basis for this system so that it will provide users with enhanced investment-planning functionality (see orange section of pyramid diagram below). This single fact makes the new system markedly different from IHIS.

There are no existing and applicable data models used to integrate data for similar purposes forcing the team to create an original architectural model from the ground up.

The project is genuinely innovative because of the needs-based approach that the team is using during their design process. As part of this approach, the team is bucking the trend that encourages the use of cutting-edge technology as an end in itself. Project Team Leader Jeff Baker notes, "Focusing on the data is the important step...it's easy to get caught up in the technology of databases, networks and GIS, but our real challenge lies in making sure we have the right data available in the application to do corridor planning, assess the condition of the network, and report performance results."

The impressively large scope of the new inventory system will allow the integration of management systems across the ministry. Jeff Baker states, "Our Ministry colleagues are excited about this project as it will create the environment in which future data sharing is facilitated [in a centralized manner]."

At this point in the project, Alison Bradbury, Head of Investment Planning is confident as she says, "We have a clear focus of what we want the application to do to support investment planning and the data needed to do it."

A pilot is planned for Fall 2005. Results from the pilot will be used to further refine the application prior to full implementation across MTO in 2006. »

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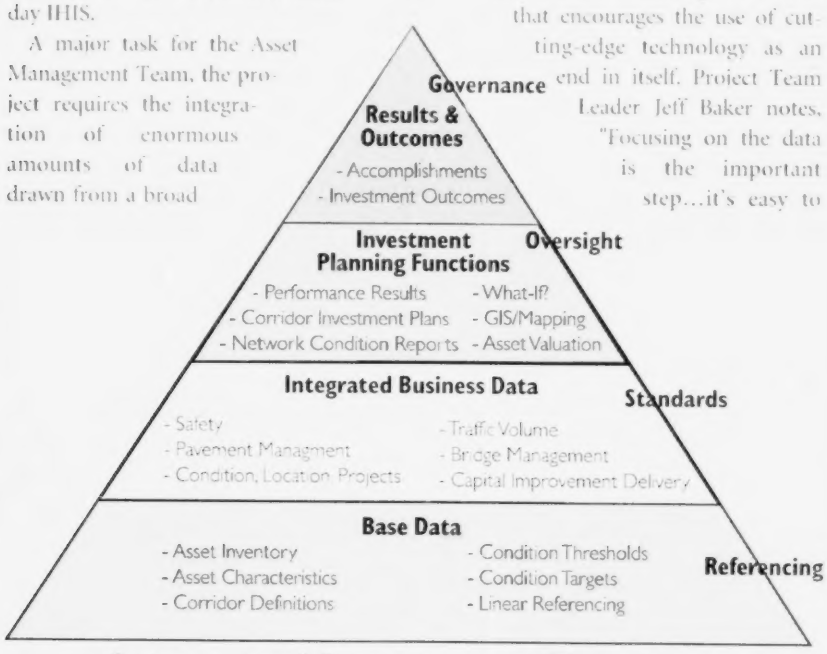


Integrated Investment Planning

LEFT: A typical management information pyramid showing the information, processes, and data management involved in the new integrated information system

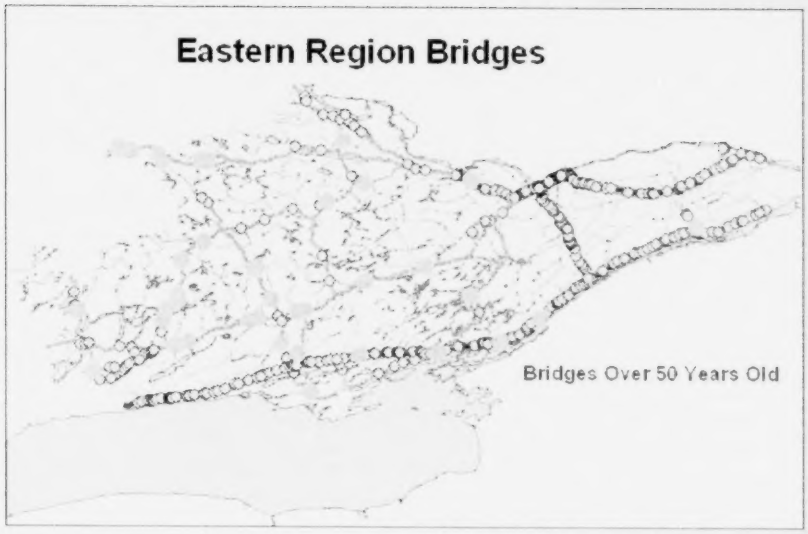
Custom GIS in Eastern Region

The Structural Section of MTO's Eastern Region is enhancing their ability to use data by creating a customized Geographic Information System (GIS). Steve Reid (Senior Structural Drafter), and Al Roud (Engineering Systems Officer) of the Structural Section initiated this project because of the difficulty they had doing culvert inspections. Their project has provided Eastern Region with thematic mapping capability specifically tailored to the needs of the Structural Section. Moreover, their project has demonstrated how any office can use GIS to improve operations.

The story of Eastern Region's GIS initiative began with the difficulties that the region had when trying to find culverts at the side of highways. Before the GIS was implemented, engineers would have to drive slowly along the shoulder of a highway trying to find a culvert visually. To deal with this issue, Eastern Region's staff began using a handheld Global Positions System (GPS) to record the exact position of culverts.

Unfortunately, the time intensive activity of gathering GPS coordinates provided a major challenge to collecting data. This prompted Reid and Roud to develop more efficient research techniques in their search for the location of culverts. Some co-ordinates were found using an existing pool of data. Others were found using aerial photography. This research amassed a complete database in a fraction of the time it would have taken if done in the field manually.

More recently, Steve Reid and Al Roud received GIS training. This gave them the ability to take their GPS data and organize it into the practical format of a map. Using ArcGIS, an integrated collection of GIS software, they created a GIS that combined maps with databases containing information regarding bridges and culverts.



The results of a query using Eastern Region's new GIS

Eastern Region now has a culvert and bridge database that is compatible with GIS. Using either one of these databases, users can create any number of thematic maps and display specific features on them as defined by a simple query. For example, a user may choose to view only culverts, and classify them by size or condition into different colours.

Eastern Region's engineers find that this GIS is a valuable addition to field work. Now, as Steve Reid describes, "Having our map loaded onto a laptop computer with a GPS connected allows us to drive and monitor our movement." This takes the guesswork out of finding culverts and bridges. "This [also] provides a much safer and efficient way to do culvert inspections," said Reid.

Moreover, Harold Kleywegt, also of Eastern Region's Structural Section, noted that the training one goes through to begin using this software is fairly light. It took Reid and Roud a mere four months, through an on-line course, to pick up the necessary skills.

"The sky's the limit," says Kleywegt, who has nothing but praise for Al, Steve, and GIS. He hopes this technology continues to develop and be adopted in all parts of Eastern Region and other jurisdictions over the next few years.

For more information, contact Harold Kleywegt, Structural Section, Eastern Region at (613) 545-4715 or at Harold.Kleywegt@mto.gov.on.ca.

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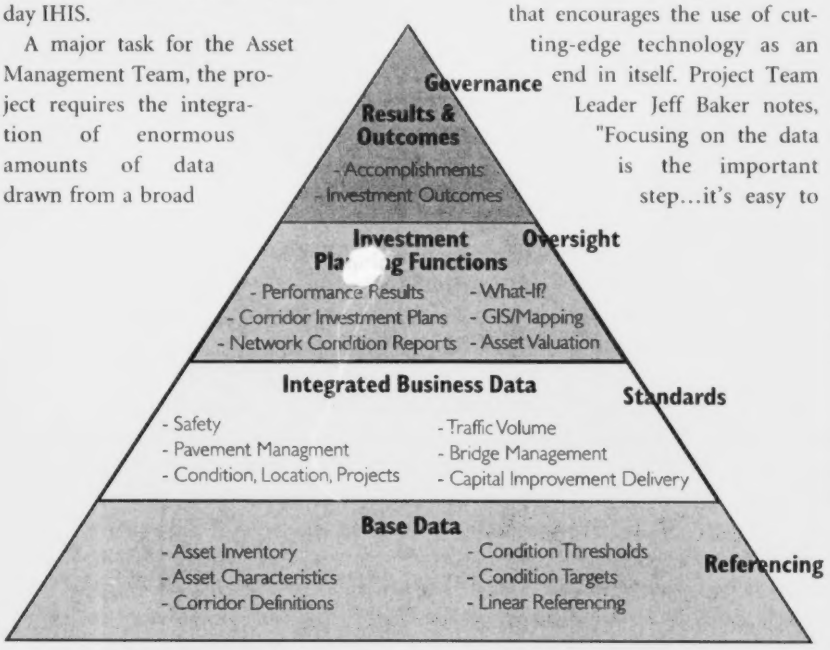

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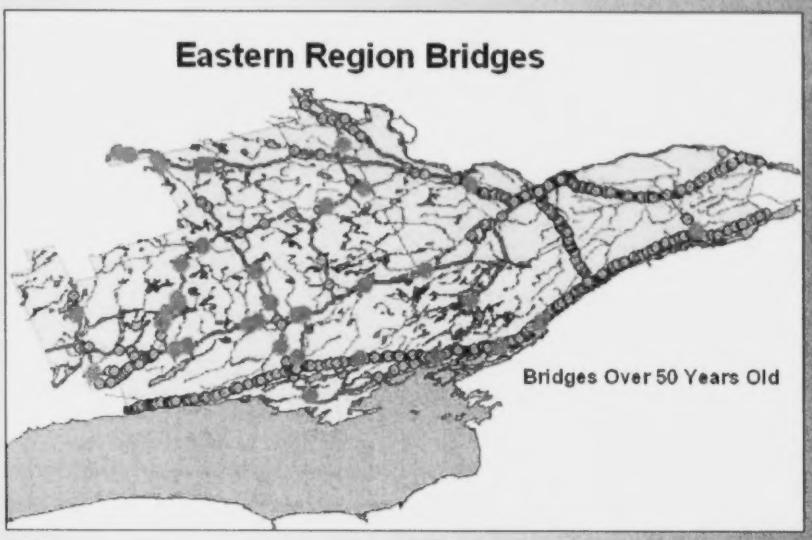


The results of a query using Eastern Region's new GIS

Eastern Region now has a culvert and bridge database that is compatible with GIS. Using either one of these databases, users can create any number of thematic maps and display specific features on them as defined by a simple query. For example, a user may choose to view only culverts, and classify them by size or condition into different colours.

Eastern Region's engineers find that this GIS is a valuable addition to field work. Now, as Steve Reid describes, "Having our map loaded onto a laptop computer with a GPS connected allows us to drive and monitor our movement." This takes the guesswork out of finding culverts and bridges. "This [also] provides a much safer and efficient way to do culvert inspections," said Reid.

Moreover, Harold Kleywegt, also of Eastern Region's Structural Section, noted that the training one goes through to begin using this software is fairly light. It took Reid and Roud a mere four months, through an on-line course, to pick up the necessary skills.

"The sky's the limit," says Kleywegt, who has nothing but praise for Al, Steve, and GIS. He hopes this technology continues to develop and be adopted in all parts of Eastern Region and other jurisdictions over the next few years. ●

For more information, contact Harold Kleywegt, Structural Section, Eastern Region at (613) 545-4715 or at Harold.Kleywegt@mto.gov.on.ca.

New Aesthetic Bridge Guide

Brawn and Beauty

New bridges in Ontario may soon be earning more design awards thanks to a new report that helps engineers design bridges with aesthetics in mind. This report, entitled Aesthetic Guidelines for Bridges, was recently prepared for MTO by a knowledgeable team of architects and engineers. Its goals are two-fold, 1) to make MTO's engineers aware of the role aesthetics play in bridge design, and 2) to act as a guide for structural engineers who want to design pleasant looking bridges.

The report could also encourage many engineers to rethink the way they design bridges. The Manager of MTO's Bridge office, Bala Tharmabala, notes that engineers try to make their bridges look good, but that successful results exist only on a "hit and miss basis." Now, with a set of guidelines, they will have an analytical basis for making aesthetically sensitive design decisions.

Artistic impression of the Garden City Skyway

The guideline deals with its subject – aesthetics – in a methodical manner. It systematically describes the various parts that make up a bridge, and illustrates design variations that could make a given component more aesthetically pleasing. This format makes the report very approachable for most engineers.

Most of the report's information is directly applicable to all bridge design. That being said, the guidelines will be especially helpful to anyone designing common "workhorse" bridges (those with a main span of 80 metres or less), as these bridges form the main focus of the report.

To learn more about this report, or to obtain a PDF copy, please contact the person shown below.●

For more information, please contact Iqbal Husain, Bridge Office, at (905) 704-2376, or at Iqbal.Husain@mto.gov.on.ca.

In the future, please see MTO's online library at: http://192.75.156.22/sydneyweb/cgi/swebmnu.exe?act=3&ini=splusweb for copies of these or other bridge related reports

Heritage Bridge Guidelines

Identifying a Rich Heritage

The Ministry of Transportation (MTO) is collaborating with the Ministry of Culture (MOC) on the Ontario Heritage Bridge program. This program helps MTO's engineers consider the historical significance of bridges in addition to typical safety and cost issues. As part of this collaboration, the two ministries commissioned the University of Waterloo to draft a study entitled, Identification and Assessment Guide for Bridges Built in Ontario Between 1945-1965. The completed study will be incorporated into the revised Heritage Bridge Guidelines when they are published sometime in 2005.

The purpose of Waterloo's assessment guide is to single out any bridge built between 1945 and 1965 that may require a more detailed heritage assessment in the future. It augments the current Ontario Heritage Bridge Guide that was released as a draft in 2000. Bridges built before 1945 will go through an assessment based on this older guide, while those built between 1945 and 1965 are subject to the Waterloo report. Over the next few months, MTO's Bridge Office will be working with the Environmental Section and MOC to combine both documents into a new Heritage Bridge Guide. Waterloo's report will play a major role in efficiently preserving the province's precious heritage sites.

An important feature of the Waterloo guide is a 100-point scale that helps user(s) determine whether a bridge can be given a heritage designation. The scale's key judging criteria relate to the bridge's construction, history, and aesthetic appeal. Construction criteria include factors such as material, style, and builder. Overall aesthetic and historical criteria include the bridge's design, location, interplay with surrounding environment, and associations with people/events of the past.

The Heritage Bridge Program demonstrates how MTO considers many factors in its maintenance and rehabilitation work on Ontario's highways. The work of a bridge engineer involves many dimensions, and initiatives such as this program help these engineers keep all relevant details in mind.●

For more information, please contact Dino Bagnariol, Bridge Office, at (905) 704-2404, or at Dino.Bagnariol@mto.gov.on.ca.

Northwest Wins with Wood

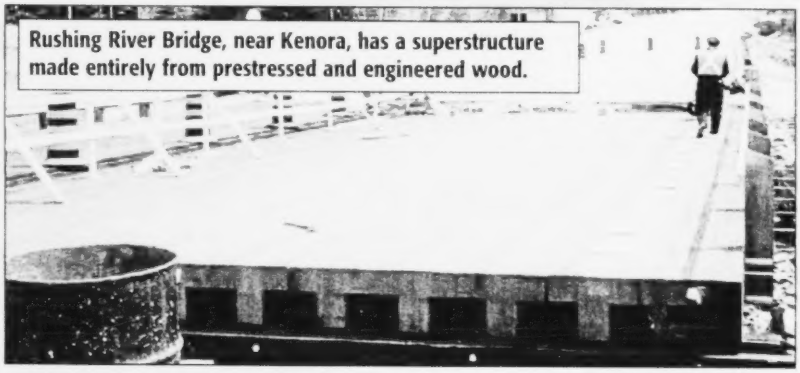
In November 2004, the Canadian Wood Council honoured North West Region's Structural Section for innovating the use of wood in bridge construction. The award recognized eight bridges that were designed and built between 1992 and 2003.

The Structural Section used wood in several different ways when designing these bridges. Some bridges had a prestressed wood deck that was integrated with steel girders. This technique gave these bridges a very lightweight and stiff superstructure. Other bridges, like the Rushing River Bridge near Kenora (shown at bottom-right), had superstructures made entirely from prestressed wood.

The Structural Section decided to use wood because it is less expensive than steel or concrete in many remote areas of the North-West Region. They used engineered wood and innovative stressing techniques to assure that no longevity or durability problems would arise. Thanks to these innovative techniques, MTO owns some of them most unique bridges in the country.

Those who would like to know more about existing wooden bridges or upcoming projects on review can contact the person below. ●

For information, contact
Ray Krisciunas, Structural Section, Northwest Region, at (807) 473-2064 or at Ray.Krisciunas@mto.gov.on.ca.



Rushing River Bridge, near Kenora, has a superstructure made entirely from prestressed and engineered wood.

Outstanding Achievement Recognized

The American Association of State Highway and Transportation Officials (AASHTO) Highway Subcommittee on Design (SCOD) presents annual awards for National and Regional merit. This year the awards were presented at the SCOD Banquet on June 10, 2004.

Joe Bucik, Manager of the Highway Design Office, won the Design Award for Region 3, presented in "recognition of outstanding achievement in the field of highway and transportation design."

The regional steering committee receives nominations from within its membership and makes the selection of the award recipient usually based on achievements in AASHTO-related work. ●

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MTO Wins Award For Salt Storage Innovation

More Than A Salt Dome

The Ministry of Transportation (MTO) recently received an Excellence in Storage award from the Salt Institute of Canada. This award was given to recognize a newly built, state-of-the-art salt storage facility located near Owen Sound (see "Salt: The Spice of Ice," Road Talk, August 2004).

The facility provides for enhanced winter maintenance operations while protecting its surrounding environment. Unlike buildings that simply store salt, this structure can accommodate the loading of winter maintenance vehicles inside, and houses a vehicle washing facility with controlled containment. These features prevent salt runoff from reaching surrounding soil, and ensure that very little waste occurs during salt handling.

The Excellence in Storage award was presented in Mississauga on October 21st at the 2004 Snow and Ice Colloquium, an event hosted by the Ontario Good Roads Association. Several members of MTO's Southwest Region were in attendance to accept the award including, Rob McInnis, Glen Hill, Dave Chessell, and Jim Nicoll. Boyd Gingrich and Larry Dickinson also played major roles in assuring the structure was completed.

For more information, contact
John Roberto, Maintenance Office, at (905) 704-2973 or at John.Roberto@mto.gov.on.ca.

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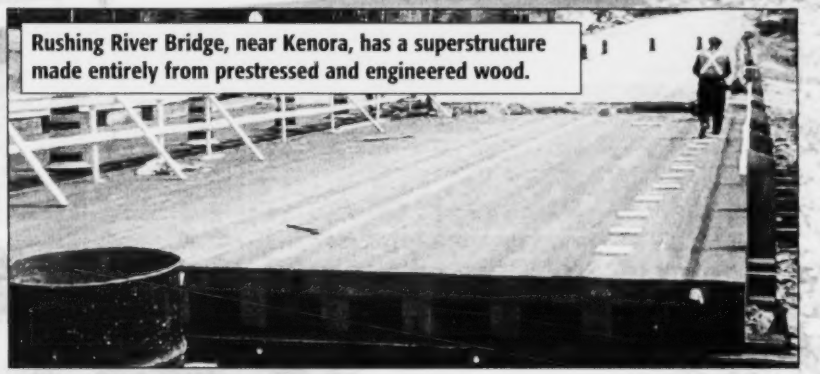

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2004 Canadian Society of Value Analysis Conference

Value Solutions: A Path to Sustain Infrastructure

MTO was a major sponsor of the annual Canadian Society of Value Analysis (CSVA) conference held in Toronto, October 25-26, 2004. MTO supports the CSVA's mission to promote the application of the value methodologies as well as the conference objective to encourage public sector use of value engineering and risk analysis on infrastructure projects. The conference demonstrated public and private sector approaches to value engineering and risk analysis in two areas: 1) project portfolio management, and 2) the planning, design and construction of infrastructure. Speakers from the Ontario, Quebec and Alberta governments, the Washington State Department of Transportation, the manufacturing industry, provincial agencies, municipalities and the consulting industry contributed to the conference.

The Honourable David Caplan, Minister of Public Infrastructure Renewal (PIR), delivered a keynote address that highlighted the challenges governments face to meet infrastructure demands. Minister Caplan referenced PIR's new Infrastructure Planning, Financing and Procurement Framework for Ontario's Public Sector. This framework was developed by PIR to guide all Ontario Ministries in choosing the best options for planning, financing and procuring public infrastructure. On this topic, the minister noted that, "Every investment must demonstrate value for money. This means that public infrastructure should be cost-effective and … should be completed on time and on budget."

Value Solutions to meet various infrastructure challenges were presented in a number of themed tracks including:

More Value in Water (Panel discussions and presentations from London, Niagara, Halton, Waterloo, Durham, and Peel)

Healthier Health Care (Red Deer Hospital case study, application of VA to health care)

Buildings with Value (University of Guelph, Harbourfront, VE team performance with Uniformat)

Reducing Project Risk (Uncertainty based estimating, incorporating risk into VE, project portfolio management). The track concluded with a lively panel discussion on risk analysis featuring experts from Canada, the United States, and Europe.

Horizontal Integration (Restructuring government, performance measurement, using functional performance specification with stakeholders (utility companies)).

Constructability, Digging Value (Transportation VE studies, Construction Change Proposals)

The conference began and ended with a series of training and information sessions. An introductory session was hosted by MTO and presented value methodologies to conference attendees. Success stories from MTO and the Region of Halton were featured during this session. The post-conference learning sessions dealt with the following:

- Life cycle costing for building design and sustainability
- Horizontal integration using functional performance specification

and…

Continued on Page 9 >

Value Engineering (VE) (also known as Value Analysis (VA)) is a systematic and function-based approach to improving the value of products, projects, or processes. VE uses a combination of creative and analytical techniques to identify alternative ways to achieve objectives. The use of Function Analysis differs Value Engineering from other problem solving approaches. In Function Analysis, an active verb and a measurable noun describe a function. As an example, a function of Road Talk is to "transfer technology".

Road Talk asked MTO's Chief Engineer, Ray Mantha, for his perspective on technology transfer opportunities stemming from the conference:

I found the conference to be directly applicable to project and program management at MTO. I focused on the sessions dealing with portfolio management, reducing project risk, and constructability. I was also intrigued by the approach used by the Public Curator of Quebec in redesigning government using Value Management and the Washington State DOT Cost Validation Estimation Process

This conference embodied a true partnership where individuals from government agencies at all levels and from private firms with common interest assembled to share of their experiences, ideas and challenges because of a passion.

Ray Mantha, Chief Engineer, MTO

>

• Risk-based evaluation of transportation projects

Complete conference proceedings are available at www.scav-csva.org/v2/EN/events.php. As well, information on VE methodologies and MTO's VE success stories can be found at www.mto.gov.on.ca/english/transtek/ve. For further questions, links to the email addresses of MTO's Value Engineering Coordinators are found in the accompanying table.●

For more information, contact Steve Holmes, Senior Value Engineer, at (905) 704-2286 or at Steve.Holmes@mto.gov.on.ca.

Hon David Caplan, Minister of Public Infrastructure Renewal (Centre), Roger Giroux, Director General of Protection for the Public Curator of Quebec (left), Rakesh Shreewastav, MTO (right)

Head Office	Stephen Holmes
Northwest Region	Dan Preley Doug Cooper
Northeast Region	Mike Pearsall Roch Pilon
Southwest Region	Dennis Regan Kevin Boudreau
Eastern Region	David Kerr Norm Meyers Ted Lane
Central Region	Dan Remollino Lola Vaz

Upcoming Conference Information

April 20-21, 2005
Minnesota Spring Maintenance Training Expo. Saint Cloud, Minnesota, USA.

April 26-27, 2005
16th Annual Center For Transportation Studies Transportation Research Conference. Saint Cloud, Minnesota, USA.

April 28, 2005
Transportation Planning Workshop. Holiday Inn, Burlington.

May 11-13, 2005
Minnesota Public Works Association Spring 2005 Conference. Nisswa, Minnesota, USA.

May 15-17, 2005
2005 Transportation Management Association Summit. Minneapolis, Minnesota, USA.

June 5-7, 2005
2005 Ontario Traffic Conference (OTC) Annual Convention. Holiday Inn, Burlington.

June 12-17, 2005
AASHTO National Transportation Management Conference. Savannah, Georgia, USA.

August 22-24, 2005
2005 Public Transportation Conference & Expo. Seatac, Washington, USA.

New Student Employment Initiative: Infrastructure Opportunities Partnership

Ontario's civil engineering industry is currently experiencing challenges when trying to attract new engineering professionals. To address this need, six public infrastructure organizations have partnered to create a student recruitment program with the goal of bringing new graduates into the transportation and infrastructure sector. The program is called the Infrastructure Opportunities Partnership (IOP), and offers undergraduate engineering students summer work opportunities in the civil engineering field.

These opportunities are provided by three-way partnerships formed between one owner, one consultant, and one contractor. Each partnership commits to offering three engineering students work during their undergraduate career. Each student spends one 4-month summer work term with each employer on a rotational basis over the course of three years. Students are accepted to the program after their first year of studies and, because there are three partners, they are guaranteed summer work for their entire undergraduate career. During this process, students gain exposure to every type of organization in the public infrastructure field. By exposing these students to the civil engineering industry, more young talent will hopefully be drawn to the field when choosing their future career direction.

In order to learn more about this program or apply to be an employer or an employee, please contact Heather Crewe from the Ontario Good Roads Association at heather@ogra.org.●

Reader Response

Please help Road Talk become more effective

Send us any ideas, comments, or suggestions concerning local innovations, workshops, or seminars that you would like to see included in future issues.

Road Talk is also available in French.

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